

Remarks

Applicants' thank the Examiner for the phone interview on September 6, 2006. Claims 1-26 are currently pending in the patent application. Of these pending claims, only claims 1, 12, 18, and 21 are independent claims. Claims 2-11, 13-17, 19-20, and 22-26 depend from these claims. Applicants respectfully request allowance of all the pending claims in view of the subsequent remarks regarding the above-mentioned independent claims.

I. Claim Amendments

Applicants have amended independent claims 1, 12, 18, and 21. Claims 1, 12, 18, and 21 now have a limitations of identifying a non-edge and enhancing the true edge by increasing the difference between the true edge and the non-edge, so that the true edge is sharpened. Support for these amendments can be found in the detailed description at least on page 1, lines 21-24, page 3, lines 32-35, page 4, lines 9-11, page 12, lines 11-15, page 14, lines 7-10. Dependent claim 15 has been amended to state "configured" rather than "operative."

II. 35 U.S.C. §102 Rejections

In the Office Action mailed July 6, 2006 ("Office Action"), claims 12-14 and 21-23 were rejected under 35 U.S.C. §102 as unpatentable over U.S. Patent No. 5,850,294 to Apostolopoulos, *et al.* ("Apostolopoulos"). Since claims 12 and 21 are independent and claims 13-14 and 22-23 depend therefrom, the comments below will focus on the independent claims 12 and 21.

A proper rejection of a claim under 35 U.S.C. § 102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983). The test is the same for a process. Anticipation requires identity between the claimed process and a process of the prior art. The claimed process, including each step thereof, must have been described or embodied, either expressly or inherently, in a single reference. *See, e.g., Glaverbel S.A. v. Northlake Mkt'g & Supp., Inc.*, 45 F.3d 1550, 33 USPQ2d 1496 (Fed. Cir. 1995). Those elements must either be inherent or disclosed expressly. *See, e.g., Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628,

2 USPQ2d 1051 (Fed. Cir. 1987). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *See, e.g., Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ2d 1001 (Fed. Cir. 1991). In summary, the single prior art reference must properly disclose, teach or suggest each element of the claimed invention. Moreover, “every element of the claimed invention must be literally present, arranged as in the claim. . . . The identical invention must be shown in as complete detail as is contained in the patent claim.” *See, e.g., Richardson v. Suzuki Motor Company Co.* 868 F.2d 1226, 1236 (Fed. Cir. 1989).

Apostolopoulos does not disclose the limitations found in Claims 12 or 21, as amended. Specifically, as stated in claim 12, *Apostolopoulos* does not disclose “an edge enhancer configured to detect a ***candidate edge and a non-edge*** in the processed image, determine if the candidate edge is a ***true edge*** or a non-edge, and to sharpen the ***true edge*** in the processed image by ***increasing the difference*** between the true edge and the non-edge, thereby sharpening the true edge.” (Emphasis added.) Furthermore, as stated in claim 21, *Apostolopoulos* does not disclose “detecting a ***non-edge*** in the processed image; detecting a ***candidate edge*** in the processed image; determining if the candidate edge is a ***true edge*** or a non-edge; enhancing the ***true edge*** in the processed image by ***increasing the difference*** between the true edge and the non-edge, thereby sharpening the true edge.” (Emphasis added.)

Claims 12 and 21 are not anticipated for at least the reason that *Apostolopoulos* does not teach every claim element. Thus, Applicants respectfully request allowance of pending claims 12-17 and 21-26.

III. 35 U.S.C. §103 Rejections

In the Office Action, claims 1-11 and 18-20 were rejected under 35 U.S.C. §103 as unpatentable over *Apostolopoulos* in view of U.S. Patent No. 5,418,574 (“*Miyabata*”) and further in view of U.S. Patent No. 6,246,783 (“*Avinash*”). Since claims 1 and 18 are independent and claims 2-11 and 19-20 depend from these independent claims, the comments below will focus on these independent claims. As detailed below, a proper *prima facie* case of obviousness has not been presented. The rejections should be withdrawn for at least this reason.

For a *prima facie* case of obviousness, there must be a motivation to modify the reference or combine reference teachings, *and* the cited references must teach or suggest all of the claim limitations *with* a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). In order for a reference to be effective prior art under 35 U.S.C. § 103, it must provide a motivation whereby one of ordinary skill in the art would be led to do that which the applicant has done. See *Stratoflex Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed. Cir. 1983). The Patent Office has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness, which can be satisfied only by showing some objective teaching in the prior art would lead one to combine the relevant teachings of the references. See *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). It is axiomatic that in order for a *prima facie* case of obviousness to be properly presented, a motivation to combine the references either must exist expressly or implicitly. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998).

There is nothing taught or suggested in *Apostolopoulos* that the edge related processing of *Miyabata* or *Avinash* could be combined with the method of *Apostolopoulos*. Applicants respectfully submit that the presence of edge distortion in the edges of *Apostolopoulos* does not suggest eliminating or reducing the edge distortion. As recognized by the Examiner in the Office Action on page 5, *Apostolopoulos* and *Miyabata* do not teach “sharpening” as claimed in the present application. There is nothing in *Apostolopoulos* or *Miyabata* to suggest that, even if bolstered by *Avinash*, the resultant method would provide a method suitable for use in sharpening an edge as in the present application. Further, although *Avinash* discloses edge detection, it does not teach nor suggest that, if used as described therein, the presently claimed edge enhancement would result.

Avinash’s goal is “to improve the quality of medical images.” (See col. 2, lines 18-19) *Avinash* addresses MRI image capture and subsequent processing. One skilled in the art would not look to such a reference in order to solve a problem resulting from compression and decompression of digital images. Furthermore, MRI images are not in color. The teachings of *Avinash* do not carry over to color images. The aforementioned lack of motivation to combine

Apostolopoulos, Miyabata, and Avinash, together with *Avinash*'s teachings directed toward non-color MRI images, establish a lack of a *prima facie* case of obviousness in the present case.

Furthermore, the cited references do not teach or suggest all of the claim limitations with a reasonable expectation of success. *Avinash* does not correct the failures of *Apostolopoulos* and *Miyabata*. *Avinash* does not teach enhancement by sharpening through increasing differences between a true edge and a non-edge. *Avinash* does provide a sharpening technique. However, there are significant differences between the technique of *Avinash* and the Applicants' claimed invention.

Avinash contemplates "segmentation-based...sharpening" in col. 5, lines 62-27, this however, is not sharpening based on a true edge vs. non-edge basis, but rather, sharpening based on emphasizing black edges, white edges, or all edges. Col. 7, line 34-Col. 8, line 7 and Col. 10, lines 19-26. After the *Avinash* invention uses segmentation-based sharpening, *Avinash* is left with strong edge regions and weak edge regions. Col. 8, lines 4-7. After sharpening in the Applicants' invention, true edges and non-edges remain as a result of increasing the differences between them.

Avinash teaches away from sharpening between a true edge and a non-edge. The "sharpening and segmentation" at block 212 in *Avinash* begins in Col. 6, line 60 and goes to Col. 8, line 3. This algorithm, determines a mean *smoothing* value for every pixel, determines a maximum *smoothing* value for every pixel, determines a threshold based on this maximum *smoothing* value for every pixel, and then, based on a segmentation selection (see above), differentiates just black edges from every pixel, just white edges from every pixel, or *all* pixels which results in a division of strong edge regions and weak edge regions. *Avinash* accomplishes this by strengthening all the pixels in the image. Thus, *Avinash* teaches sharpening white edges Col. 7, lines 43-52, sharpening black edges Col. 7, lines 53-61, and sharpening all pixels Col. 7, line 62-Col. 8, line 3. This is not sharpening a true edge by differentiating true edges and non-edges as claimed in the present application.

The reference provided but not relied upon by the Examiner for this rejection, U.S. Patent No. 6,229,578 ("Acharya"), does not correct the failures of *Avinash*. Acharya does not disclose *sharpening* between a true edge and a non-edge. Acharya states that it distinguishes "between

edge and non-edge pixels.” See Abstract. However, *Acharya* accomplishes this through noise removal algorithms that average the intensity among edge pixels. *Acharya* discloses an edge sensitive noise filter that uses edge-sensitive operators (conditional averages). Fig. 4 and Col. 11, lines 41-45. This is not equivalent to Applicants’ claimed methods and systems that increase the difference between a true edge and a non-edge, thereby sharpening the true edge.

In the Office Action, claims 15-17 and 24-26 were rejected under 35 U.S.C. §103 as unpatentable over *Apostolopoulos* in view of *Miyabata*, *Apostolopoulos* in view of U.S. Patent No. 5,844,614 (“*Chong*”), or *Apostolopoulos* in view of *Acharya*. Applicants request allowance of these dependent claims in light of the comments above regarding independent claims 12 and 21 from which they depend.

In order to support a rejection under 35 U.S.C. §103, the Examiner must establish a *prima facie* case of obviousness. Thus, the initial burden of proving obviousness lies with the Examiner. Since the Examiner has not identified in the Office Action a proper motivation to combine or a teaching/suggestion of all the claim limitations, there can be no finding of obviousness. Thus, Applicants respectfully request allowance of pending independent claims 1-11 and 18-20, as amended in view of the remarks above.

IV. Conclusion

Claims 1-26 are currently pending in the patent application. Of these pending claims, claims 1, 12, 18, and 21 are independent claims. As the Court noted in *In re Fine*, "dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious." 5 U.S.P.Q.2d 1569, 1600 (Fed. Cir. 1988). Using this same rationale, dependent claims cannot be anticipated if the independent claims from which they depend are not anticipated. Since the Applicants respectfully assert that these independent claims are allowable, dependent claims 2-11, 13-17, 19-20, and 22-26 are also allowable. Thus, Applicants respectfully request allowance of all the pending claims.

No amount is believed due; however, the Commissioner is hereby authorized to charge any fees which may be required to Deposit Account No. 14-0629.

Respectfully submitted,

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